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SOCIAL SCIENCE ASSOCIATION.

BUILDING SYSTEMS FOR THE GREAT CITIES.

A PAPER READ BEFORE THE ABOVE ASSOCIATION, APRIL 5, 1877.

BY MR. LORIN BLODGET.

REPRINTED FROM THE PENN MONTHLY FOR APRIL, 1877

PUBLISHED BY THE
PHILADELPHIA SOCIAL SCIENCE ASSOCIATION,
720 LOCUST STREET, PHILADELPHIA.

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A BUILDING SYSTEM FOR THE GREAT CITIES.— THE BUSINESS AND SOCIAL INFLUENCES OF BUILDING SYSTEMS ILLUSTRATED.

THE questions presented in the modern life of cities are among the greatest we have to deal with. The tendency of population is now more than ever before, to concentrate in communities which offer the fullest measure of business and social advantages, and in spite of every effort to disperse the increasing population of the older states, the result is that the greater cities increase more rapidly than any part of the country outside their limits. A great city affords much more of positive attraction than it has been usual to concede, and its attractions are not those of fancy or taste only; they are, in the highest degree, those of economy and profit in the exchange of what every man can produce. The greater share of the accumulated wealth of cities is made up of labor put to the best uses, and of exchanges made without loss.

But the facilities the cities afford in the creation and exchange of wealth, have heretofore had a dark side in the losses and insecurity to which persons of moderate means, and particularly to which all persons who work for wages, have been subjected. The separate household, and the independence of ownership, have become more and more difficult of attainment, and with the loss of these, a loss of much more became almost inevitable. It has for years been an unfortunate feature of the social condition at New York particularly, that the increasing population were without homes, except in tenement houses, or flats, or some form of subordinate or dependent residence, the injurious consequences being apparent, and the evil increasing instead of diminishing. The tenant, or tenement house is the worst form of this huddling of people, chiefly the laboring classes, or the poor as they are called, in such cities, into close and stifling rooms in a building usually of the most squalid surroundings. Enterprising and benevolent people have made many efforts to reform and improve these tenement houses, but with little success. A building containing from forty to a hundred rooms, each of which is separately let to one or more persons—no family having more than two—can scarcely be expected to offer any incitement to cleanliness, order and self-respect. Certainly all experience proves that rapid and permanent demoralization follows upon the gathering of laborers,

or of the employed classes of any grade, in any form of tenant or tenement house at present in use.

To inspire self-respect, to develop or even to sustain independence of character and to insure morality and social order, the separate house and family are indispensable, at least with the great body of people. And the struggle to avert demoralization and distress is real and pressing; it will not admit of delay or evasion. The tenement house is a danger and a shame. It is a frightful inhumanity also; not only where the loss of life by pestilence is incurred, but also in the frequent deadly accidents by fire and falling walls which are now so common. Our exemption from these calamities in Philadelphia is almost complete, yet they are near enough to us to be vividly realized in the few we see, and the frequency with which we hear of them in other cities.

The urgent question of the day is whether it is possible for the people of this country to live in the great cities in safety, occupying separate homes, and living in reasonable security in dwellings of their own. It is certainly a great question, and on its solution depends the further question, whether it is not inexcusable cruelty to permit a million of people to gather in any great city.

Through the rare good fortune of possessing an especially favorable site, the development of an adequate system of city house building has fallen to Philadelphia, at least so far as the inauguration of such a system is concerned; and perhaps fifteen years of continuance at it, have vindicated and confirmed it. It cannot be claimed as having been deliberately designed, nor is it as yet carried to anything like its proper completeness of results. But it has made great progress, and has grown to such proportions as justly to attract attention in most of the cities where the want of a proper system causes great loss and suffering. The object of this paper is to state, as clearly and directly as possible, what has been done here, in order to aid others in making use of the results of our experience. It is also desirable just now to help forward the general work of perfecting the system here, and it cannot be too strongly stated that the object proposed to be attained is almost the highest that can engage attention. It involves the greatest results possible in the happiness of great numbers of intelligent people, and in their advancement to a higher civilization. It affects the habits of the thousands who too often spend their small earnings in mere daily living: and decides whether or not they can ac-

quire and possess real property, The difference between a proprietor, however small, and an incapable or a wasteful spendthrift, often reaches far beyond the personal interests of either or both, and becomes an element of the greatest public dangers.

The actual mode of proceeding in what are here called building operations is co-operative. The owner of the title to the land unimproved is one party, the one who advances capital or money to build is another, the contracting builder another, and often the several sub-contractors enter into the work as parties in interest, agreeing to take a certain number of houses as their share of the cost of building a large number. The co-operation of three distinct interests is the most general, the land owner, the capital advancer, and the contracting builder; but it is perhaps equally frequent that the land owner advances a sum of money equal to the value of the ground, which sum of the two elements of cost is placed in a ground rent or mortgage on the building contracted to be built. But the co-operative feature is always foremost, and it is indispensable to success. If the furnisher of materials, as lumber, bricks, stone or anything else, agrees to take a number of finished buildings for his materials, he probably values his materials higher than if sold for cash, but he simply shares in the profit of the general contractor, and is a co-operative builder himself. The fact that in some cases this co-operative building is not as well done as it should be, is quite likely to be realized, but it only occurs when proper supervision is not provided for. As compared with building for cash under rigid supervision, the loose co-operation of what are called bonus building operations is not desirable; yet many thousand dwellings have been so built in a most creditable manner, and now constitute streets and blocks much increased in value, fully occupied, and paying a fair profit on all they cost. Thousands of dwellings have been so erected by contractors who had no capital themselves, and who, in perhaps half these cases, made little profit. Others more skilful made profits rapidly even by what is called bonus building, and became able to build with their own capital.

The public are concerned only with the final results; if these present the form of well-built streets of permanent dwellings, owned by those who occupy them, it is of little consequence whether the original builder had any capital or made any profits, whether the operation was a co-operative or "bonus" arrangement, or whether all the expenditure was by one party only.

Of the mode of erecting buildings in the tenement-house system, we know little, except that it cannot be co-operative. It cannot afford negotiable securities in ground rents or mortgages, nor can it interest or employ many persons. Its range must be very narrow, and without social or other features of general interest. In a few cases such building is primarily with a benevolent purpose, and may, like the Peabody buildings in London, become conspicuous public benefits. But in most cases the tendency is to parsimony and abuse in the erection of the buildings themselves, and still more in their subsequent management and in the treatment of their tenants. The details of management of thousands of these buildings are given in the New York Sanitary Survey of 1865, and a more frightful picture of sordid avarice than that developed by that survey as existing in the management and care of these tenement houses could not be imagined. The squalor, vice and enforced misery of the unfortunate occupants exhibits a state of things to which the comfort of prisons and penal institutions affords a relieving comparison. No greater contrast can be conceived than is presented by the comparison of a well built street of two-story brick dwellings neatly kept, and chiefly owned by workingmen occupants, with the narrow alley separating double rows of lofty tenement houses, reeking with filth and vice. Surely the building surface of the earth is large enough to distribute these foul accumulations, and to cleanse them by a reasonably wide dispersion.

THE TENEMENT-HOUSE SYSTEM.

The most graphic and vivid portraiture of the tenement-house system, with its attendant miseries and horrors, was given in a Sanitary report for the city of New York, made in 1865, as the result of the survey before referred to. It was inaugurated by an association of citizens simply, but out of its disclosures grew the energetic Board of Health organization for that city established in the same year. An accurate canvass by able young physicians was then made of the entire city, the results of which are very striking. New York had then no more population than Philadelphia has now, probably less, yet the fearful concentration in certain districts or wards would appear incredible if it were not officially stated and the location and population of each house shown in elaborate plans and diagrams. In the Fourth Ward of that city there were then 714 tenement houses, and 53 private dwellings. In 242 of these tenement houses, there were

2,119 families; and in the others, which were not originally built for such uses, there was an average of 5 families, or of 28 persons to each house. The superintending officer of the survey reported that "*there are more than 400 families in this district whose homes can only be reached by wading through a disgusting deposit of refuse.*" The whole district was a permanent nursery of fever and contagious diseases. Several of the most celebrated nurseries of vice, filth, and disease are found on Rose, Vandewater, Cherry, Roosevelt and Oak streets, and they are scarcely less horrible now than in 1865. I have often visited them, and personally examined the district in 1872, finding it then incurably wretched, although the New York Board of Health had forced the tearing down and rebuilding of a few of the worst great tenement houses. One of these houses contained 105 families, and 472 persons; an alley nine feet wide separated it from another containing 25 families, and another seven feet alley reached a house containing twenty families. Neither of the three had any frontage on a regular street, being reached only by these alleys. The locality was called "*Gotham Court.*"

In the Fifth Ward of New York, the same survey showed 185 tenement houses, with 961 private dwellings, a much better condition, although the tenement houses were all reported as nests of disease.

In the Sixth Ward there were 609 tenement houses, with 4,400 families, and 23,000 tenement population. This district had then, and still has, many incurable "fever-nests." The population was less than 5 per cent. of American birth, and the well-known Baxter street is there. Then 500 persons lived in filthy cellars, but these have since been driven out. The celebrity of that ward for vice and crime has been won by a long persistence in crowding the worst of the laboring classes of a great city into tenement houses, surrounded by conspicuous and flagrant vice, and without the power that separate houses would give to preserve the rising generations from degrading contact. It is somewhat better now than in 1865, yet frightfully depraved, and hopeless of permanent reform.

In the Fourteenth Ward one-half of the buildings were tenement houses, and a very few only were private dwellings. Of its population, in 1865 numbering 33,000 (in 1870 but 26,000), four-fifths lived in tenement houses. Four small squares from the Bowery to Mott street, then contained 4,168 persons, all living in tenement houses. This district has in some respects improved.

Returning to the west side of the city, part of the First and the whole of the Third Ward constitute an Inspection District, in which there were then 241 tenement houses, with a very few private residences only. One locality in this district was described as a "perpetual fever-nest," in which many of the worst tenement houses were located. "The common mode of arranging them is as follows: On a lot of ordinary size 25 by 100 feet will be erected a front house 25 by 50 feet, and a rear house 25 by 25 feet, with a court 25 by 25 feet and frequently less; these houses are commonly 5 and frequently 6 stories high; the principal rooms, of which there are four to each floor, occupy the width of the building, front and rear, with small bed-rooms between, one to each main room. This arrangement gives accommodation to four families on each floor, making, in a six-story building, 24 families. This is the average, but there are many exceptions where the over-crowding far exceeds this." In the Seventh Ward there were 627 tenement houses; in the Eleventh 2,049; in the Sixteenth, Seventeenth, Twentieth and Twenty-first, an average of over 1,200 each; the Seventeenth having 1,890 of these structures—in all cases containing more than three families each. (See Appendix for a tabular statement in full.)

Other wards and districts give even a darker picture than this here quoted, but I have not space to refer to them. The general result is, that of tenement houses containing more than three families there were, in 1865, in New York 15,511, with an average of 8 families and 33 persons to each house; the whole number living in them was 486,000, and there were 15,224 persons then living in cellars. The total number of these unfortunates was 501,224, or nearly two-thirds of the entire population of New York!

Nothing can be more impressive than this statement of the actual condition of the half million of people who in one great city are subjected to such demoralizing influences as are described in the report from which we take these figures. I cite the facts at some length in order to enforce attention to the sanitary and social advantages of our single-house system, and to make a contrast so strong that it must receive attention. What was true of New York in 1865 is practically true to-day—there are more nearly 20,000 of these structures now, with fully 500,000 people occupying them. The general discouragement of such surroundings is adverse to habits of economy, and but little chance is afforded for

the laboring man to save enough to secure a home. Distress and demoralization are inevitable, and the suffering of this enormous class must necessarily re-act on even the wealthy in many ways. Deadly diseases are propagated from these "fever-nests" and social pest-houses, from which the wealthy resident of an adjacent street can scarcely hope to be secure. In fact, the motive to the costly survey, of which the volume I quote from is the report, was a hope that some relief from these dangers could be obtained. But it has been found in the ten or twelve years since elapsed that, although a vigorous policing may improve those crowded prison-houses for the laboring classes to some extent, and occasionally order one of the worst to be torn down, the tenement house proper is in the main incurable, a scourge to the poor man, the ruin of all hope for improvement of his family, and a terror to the neighborhood as a source of disease.

During at least the full period elapsing since this sanitary survey of New York, in 1865, I have had my attention drawn to the contrast presented by the single-house system, and to the elevating influence it has on the population of a great city, in contrast with the degradation and demoralization inevitable in the tenement house. I have made many examinations of the streets and quarters so decisively condemned in 1865, and have seen but little improvement in them. Cleanliness and healthiness are always impossible; while on the contrary, I have seen men with their families pursuing precisely the same occupations, living in Philadelphia in neatly-kept houses of their own, in cleanly streets, and with every evidence that they felt inspired by all the present comfort and hopes of improvement that elevate and honor man in the humblest as well as in the highest position.

I claim, therefore, that it is a social question of the highest character, that is raised in this discussion of the mode of building up a great city. As an act of sanitary precaution, or of benevolent public spirit, there could be no greater service conferred on a city than to introduce and enforce the single-house system. Even at a cost of large sums for cheapening the ground rents, or reducing the capital invested in their erection, an appropriation to aid the building up of streets and squares with single houses would be wise. But here, at least, no aid whatever has been or is necessary. As a business, such investment both in land and buildings pays well. There is an ample margin of profit to the land owner, to the capi-

talist, and to the working builder alike ; and when the working-man has taken shares in a building association, there is a profit to him in buying a house, and relative loss in renting one. Circumstances singularly favor the greatest work of popular beneficence almost that the world has known ; a work that may carry our population up to millions, without giving us a single square or street of squalor and shame. Such is substantially the condition of things in this city at the present time ; a population of 850,000, at least, has passed through a season of unprecedented business depression, with scarcely an instance of serious suffering, or any material check to the growth of the city, or to its expansion in streets and the erection of new houses by many thousands every year. Probably a greater number of persons are now enrolled in building associations than ever before, and are prepared or preparing through them to become owners of their own homes. Certainly the number of such members is nearly seventy thousand, and the capital accumulating reaches nearly to thirty millions of dollars ; all of which saving will in due time be invested in the coveted home, which is the object of membership in these associations.

In a recent publication of this society, embracing a valuable paper by each of two gentlemen, thoroughly qualified to state the condition of the Building Associations of Philadelphia, the statistics of these people's saving funds are given more fully than I have space to do here. Mr. Joseph I. Doran, in one of these papers, gives conclusive authority for the statement that the sum of \$50,580,000, at least, has passed through these associations into real estate in Philadelphia, from 1849 to 1876 ; and he estimates that \$7,672,000 was the amount of payments to them during 1875, at least an equal sum being invested by them during the year. He gives the number of stock-holders or members in 1876, as 67,500, or "over one-fifth of the number of persons having occupations in Philadelphia." There were 450 active Building Associations in operation in that year.

THE SINGLE-HOUSE SYSTEM.

The system of building which has grown up here in Philadelphia has attained its present position through a series of generally prosperous years, and the efforts of many practical and enterprising builders. It is scarcely to be credited to any general design, though some acts of local legislation have greatly favored it—particularly those which forbid the erection of wooden buildings, an

restrict the opening of streets less than thirty feet wide. The greater merits of the system have grown upon citizens here unconsciously, and have not received the attention they deserve. To enlightened citizens of other States and countries, however, they have been of great and increasing interest, and a wide-spread desire exists for information by which their benefits may be practically introduced into other cities. It will serve a valuable purpose even here to renew attention to the very favorable circumstances under which this city adds 5,000 dwellings annually to its present great number of occupied houses, and a fair statement of what is already attained will encourage further effort to improve and benefit the city. In all its leading features, the single-house system appears to be applicable to most other cities as well as to this; the only question is whether land is available within easy reach, and whether the price for land is not impracticably high. The street railroads, to a great extent, cover the question of mere distance, and bring a suburb five miles away within easy reach of the business center, where the workingman finds employment. In the case of New York, perhaps the difficulties of distance, and the water surroundings, become more nearly insuperable; though even there the necessary provision must and will be made for rapid transit to the wide stretch of lands within sight of the city not yet occupied. Cheap and prompt communication with the upper tracts of the island itself, and with New Jersey and Long Island across the rivers on either side, cannot be long delayed. It certainly appears as the least of the surrounding difficulties to provide this transit; and not for a moment to be compared with the constant deadly struggle against disease and vice which is forced upon them by the tenement-house system. It must be admitted that there are great difficulties in the case of a city bounded and limited as New York, but the only way to solve them is to enter at once and resolutely upon the duty of offering encouragement to those who must live in other than brown stone edifices, and to give them a chance at least for the possession of houses of their own. This can never be done in tenement-houses.

I have not now before me the exact results of Mr. Peabody's beneficence in London, but it is generally understood to have secured no more than good rooms at a moderate rental, in a well-regulated house. It is not unlike a hotel, in which the occupants provide their own food and furniture, but are subject to examina-

tion and possible rejection when they enter, and to proper discipline while there. Large capital, with benevolent direction, and permanent supervision, are essential conditions of the system. It is excellent in its way, but not generally applicable, or even possible.

All experience has shown that for the best ends of society there must be, in the relation of men and families in a city to each other, something like the theory of the citizen's position in political life; each must enjoy and retain a separate individuality, with entire liberty under due responsibility. Give every possible opportunity, but hold every man and every family in a city to responsibility as independent elements of society. In a tenement-house the occupants soon cease to recognize any responsibility; they are reckless and wasteful of what is their own, and what is not their own. In a house which has cost the occupant care and labor to purchase and to furnish, the foremost thought of the owner and occupant is to maintain and improve it.

STANDARD FORMS OF THE SINGLE HOUSE.

The form of building under the single-house system is established with much uniformity—perhaps too entirely uniform, some may say, but the necessities of the case admit only the best, and it can scarcely be denied that the forms employed are wonderfully successful. There are three primary forms, as they may be called: described as the two-story four-roomed house, the two-story six-roomed, and the three-story eight-roomed. They are always of brick, erected on stone walled cellars not less than seven feet deep, 14 by 28 feet for the smallest houses, 14 to 16 by 42 to 45 feet for the six-roomed houses, and the same for the three-story houses of eight rooms, which differ from the larger two-story houses only in having three stories on the front and two stories at the back. All these are built in contiguous rows or blocks, with a common wall between them. No external or dividing wall is less than twelve inches thick, with hard or pressed brick for the outside, and salmon, or light absorbent brick for the inner facings. There is little criticism possible upon either the materials or the mode of building of these standard houses, which have taken the place of all others almost, and are limited by well defined building laws, so that there is scarcely any opportunity for the substitution of inferior structures. In fact, there is no temptation to do so; the great number annually built, and the facility of access to unbuilt suburbs, would deprive the careless or lawless builder of all profitable use for poor houses.

Other restrictions and usages also aid in protecting those who use these houses ; they cannot be built of wood, nor can any alley be used for frontage ; no street less than thirty feet wide can be opened or built upon. Under the protection of these general conditions, building has made rapid progress since the inauguration of the system, which scarcely dates before the year 1862. In 1867 it began to be especially active, and since that time an average of 4,500 houses yearly has been erected, of which 2,500 have been two-story, 2,000 three-story, and of dwellings not more than seventy yearly of greater proportions. This rate of increase is much greater than that of other cities of equal population. At New York the annual increase of dwellings is not over 600, the most of these, indeed, being costly structures erected for the private residences of the wealthy. The number of new tenement-houses erected is small, the greater movement in this direction being the change from old buildings originally built and occupied for private dwellings or as stores or warehouses. The Sanitary Survey of 1865 found that four-fifths of the tenement-houses then in use were altered from other forms for this purpose.

In the conduct of house building, as of every other business, there are many unsuccessful attempts, and many instances in which the property changes hands before completion and occupancy. But whatever the good or ill fortune of the intervening parties, the contractor, the workman, or the furnisher of materials, the general public only need to know that the houses are built and duly occupied by owners or tenants. They pay a profit, on the whole, to each of the necessary parties to their erection, and they represent a very large and active employment of both capital and labor. Taking the average value of the 4,500 houses annually built at not over \$3,500 each, the total is \$15,750,000 of value created yearly.

The capitalization of the land itself in the erection of these buildings is a very important question in considering the application of the system elsewhere. It is generally believed that land is too valuable near New York and Boston, at least. To decide this question it would be necessary to see what these houses would be worth there. Those of two stories with four rooms are here worth \$1,200 to \$2,500 each, with a rental of \$11 to \$18 per month. The two story six-room house is worth \$2,500 to \$3,800 each, with a rental of \$16 to \$25 per month. The three story eight-roomed house is worth \$3,000 to \$5,000 each, with a rental of \$20 to \$35

per month. Taking the usual proportions of these three sizes there may be, and actually have been, built upon a square 400 by 400 feet, with exterior streets 50 feet wide, 120 to 130 dwellings on each square; and the land is capitalized at \$100,000 to \$125,000. To this is often added an equal amount as advances, or as money furnished by the owner of the land for building it up; and there may be, also, a nearly equal sum representing the further cost incurred in finally completing the dwellings. The *cost* of a built-up square, as thus made up, therefore varies from \$300,000 to \$325,000. Often the salable value rises to \$400,000 or \$450,000. Converting these items into their equivalents in cost per acre, it will be seen that the land before being built upon represents \$30,000 per acre, nearly, which is certainly a full average value for suburban real estate anywhere.

This distribution also admits an unexpected density of population. In a square mile there might be 130 squares of this size—400 by 400 feet; and with 120 houses on each square, the population would, at five persons each house, be 600 persons on a square, and 78,000 on a square mile. This is not an unreasonable dispersion, and in fact it much exceeds the average density in large cities.

The principal object of this paper is to illustrate and to urge the practical application of the single-house system of building in great cities, and to propose it for New York and Boston particularly, as an available substitute for the tenement-house system. If the land used in building can be capitalized at a sufficiently high value; if the houses can be built at a cost not exceeding twice the value of the land, and the rental, when built, will pay a fair interest on all the money and money value of the different elements of the investment, then there can be no insuperable difficulty. It cannot be expected that either the single house or the tenement house shall be built as charities; certainly not if houses of a suitable character can in any manner be obtained as paying matters of business. There is no difficulty in that respect here, and no want of readiness on the part of builders, who offer to erect houses wherever they can find vacant ground, in reasonable proximity to ground already built upon. For every year of the last ten, it has been asserted that building was overdone, and that building would not pay; yet each successive year has shown an actual record of buildings erected quite equal to its predecessor. As a rule, they are

erected by active men of moderate means, and not by capitalists; the investment of fixed capital in them being chiefly in the ground rents or mortgages. It is a system that has grown up by accident rather than by design, and it finds so large an adaptation, and meets so great a want on the part of the people, that it moves forward with a steady and regular progress not likely soon to be stopped.

The future of this expansion of cities we cannot undertake to predict. It is not necessary to assume anything definite in regard to it, except this, that the greater cities must in some way provide for much more than they now represent of surface expansion. New York cannot attain to three millions of population within the limits of the island of Manhattan, nor can Boston grow to two millions without crossing the Back Bay. A radius of five miles from any city's centre affords a great sweep for expansion, and it is already in perfectly successful use in more than one direction here. There must be and will be prompt and easy transit devised for such municipal areas, and if this is done, the singlehouse system, with its vast benefits and powerful social ameliorations, will last us yet for half a century.

OWNERSHIP AND OCCUPANCY OF HOUSES.

A further question is presented in the conditions of occupation and ownership of these single houses when built. It might be inferred that so large a number of dwellings could not be built year after year, if they were not called for and occupied; but whether they are taken as investments by persons who rent to others, or whether they are purchased directly by those who are to live in them, is an important distinction.

The facts are that chiefly through the fortunate agency of Building Associations much the larger share of all these buildings are, within two years after their erection, bought by those who live in them. An extended examination of a district near the southern border of the city, conducted by me at intervals during the past year, shows that three-fourths of the dwellings erected two years or more, are owned by those who reside in them, and nearly half of those which are properly and carefully built are purchased during the first year. In a space less than a mile square, centrally situated, but reaching to the southern limit of the built-up area, more than 4,000 dwellings were examined recently. Of these the proportion vacant was less than two per cent., and while some

blocks were carelessly erected, and remained for a year or more unfinished, all were ultimately well-finished and fully occupied. The condition in regard to personal ownership was not so easy to ascertain; certainly more than half were owned by their occupants, and often entire blocks, of thirty or forty houses each, would show not ten per cent. rented.

These statements are given simply to represent the average condition, and they would be substantially the same for any section of the city near its outer limit. The fact that several blocks on the section examined were erected by persons unable themselves to finish them, and, therefore, most likely to represent the worst phase of the single-house system, appeared to require that the facts should be ascertained. The result fully sustains the system, and shows that even in unskilled hands it cannot be a failure.

The agency of Building Associations in enabling persons, whatever their employment, to purchase these houses, is undoubtedly of the first importance. The facility for creating what may be called mortgages payable by monthly installments, secured by the house in which the mortgagor, or member of the association lives, is the greatest of all possible facilities for house-buying. It secures the principal and makes payment easy; both conditions being indispensable to any great extension of individual ownership. The almost universal division of the principal sum of cost in the erection of buildings, so as to create a first obligation, representing the value of the ground and called a ground rent, is also a very great facility. These ground rents, which are usually one-third, or less, of the value of the house and lot as finished, are the most desirable of investments for retired citizens, trusts, or estate funds. The proceeds are easy and certain of collection, not like ordinary house rents, or tenement rents particularly. It may be estimated that perhaps one-fourth to one-third of the value of the lands annually built upon, is capitalized as ground rent, and remains a fixed investment, the ownership of which may pass from one investor to another almost as an United States bond. Just now the insecurity of railroad and other stocks is inducing a much greater inquiry than usual for well-secured ground rents and first mortgages on dwellings. Taking the average of mortgages and ground rents together, it may be stated that half the cost of erecting dwellings of the classes below \$6,000 in value, and particularly of two-story dwellings valued at \$1,500 to \$3,000

each, is carried easily from the outset in permanent negotiable investments in this form. As soon as dwellings attain advancement in the course of erection, the ground rent becomes a security, and when completed and capable of occupation, a mortgage of one-third or more of the value is a negotiable security.

The business machinery of these building operations is somewhat difficult to explain, though simple and easy in actual operation. The land is "taken up on ground rent," by the builder usually, who pays for the ground itself on ground rents or first mortgages, contracting to build the dwelling in a specific time, in order to make, or as the means of making, those obligations secure. The land-owner is relieved from taxes, and the value placed upon his land becomes a productive security, bearing six per cent. interest, payable semi-annually. If the owner furnishes the money to build with, called advances, he takes securities of the same class. The land constituting a square of 400 feet or more, between principal streets, may, as has before been explained, be capitalized in this way at say \$75,000 to \$100,000, to which, if advances are made, an equal amount is added, making \$150,000 to \$200,000 in ground rents or first mortgages, for 75 to 125 dwellings. The builder requires from one-fourth to one-third the total cost of the dwellings beyond this to enable him to finish them, and his share of the transaction is the value the whole may have above the ground rents or mortgages. To our own citizens all this is, of course, familiar, but it is an essential part of the single-house system, and capable of introduction in any and every other city. It must, in some form, be introduced, in order to unite the interests of the land-owner, the capitalist who makes the advances in money, and the builder and final occupier of the dwelling built. When this is duly arranged, it will be found that the cost of the ground, even if large, is no obstruction to the introduction of the system. The necessity only is that this cost shall be capitalized in a way to enable the final occupier to carry it easily. It is also an essential point to afford time for the erection of dwellings, and to defer the commencement of interest on the several obligations a few months—three, four, or sometimes six months—in order to avoid obstructing the sale and occupation of the finished dwellings by accumulations of accrued interest.

The first statement printed in the appendix gives the result of a survey, made as this paper is prepared, of a section of the city of

Philadelphia, which fairly illustrates the single-house system as it exists here. The district stretches southward from the southern border, as built under the previous irregular systems, a mile in length by half a mile in width, two-thirds of it having been built up within five years. All the streets in this area are represented, and all the dwellings are classified. Factories and shops not used in any part as dwellings are not counted, but buildings used at the lower story front as stores or shops are counted, if also used as dwellings.

As there would be 5,000 dwellings on this area if all the spaces were built up, it may be fairly assumed that a square mile would afford 8,000 to 10,000 dwellings under this system, yet still be conspicuously open and well ventilated, with no street less than thirty feet in width.

Of these 4,252 dwellings, residents of general acquaintance with the facts estimate that two-thirds are owned by those who reside in them—in some localities, a half; in others as high as four-fifths. This very important fact has been verified by many visitors to the district during the past year.

On the west of Broad street in the south-western part of the city a very much larger district is built up in a similar manner, affording fully 6,000 dwellings of this class. In the northern sections of the city, there are still larger areas built up in the same manner, the northwestern districts being built up with three-story dwellings chiefly, but on the north and northeastern border the predominating form is of two-stories. All are brick or stone; none in any case being of wood.

In conclusion, it is proper to say that much more of explanation and elucidation is due the subject than is possible in this paper. It should be shown how the details of building are carried on; how the space is divided in dwellings of the various classes, and in what way further improvements are possible to be attained. The system cannot assume to be developed in all its beneficial relations, but it is remarkable that so much should be attained by efforts not directed in any especial degree to other than the usual objects of business.

It is often the subject of severe criticism that building operations of this class are undertaken by persons of insufficient skill, or of little capital; yet the remarkable feature is, that after much preliminary failure they are always made complete in the end.

I shall be amply rewarded if this peculiar feature of building progress and its striking social benefits receive the attention of thoughtful and benevolent men, who may see their way to apply and improve upon them in other cities. LORIN BLODGET.

APPENDIX.

BUILDINGS ERECTED AND OCCUPIED WITHIN TEN YEARS, REPRESENTING THE SINGLE-HOUSE SYSTEM IN PHILADELPHIA.

<i>Streets.</i>	<i>2-Story.</i>	<i>3-Story.</i>	<i>Vacant.</i>
Wharton, Broad to Thirteenth.....	6	11	0
“ Thirteenth to Twelfth.....	1	13	0
“ Twelfth to Eleventh (Public).....	1	0	0
“ Eleventh to Tenth.....	3	16	2
“ Tenth to Ninth.....	2	11	2
Watts, Wharton to Reed.....	4	1	0
“ Reed to Dickinson.....	36	0	6*
“ Dickinson to Tasker.....	36	0	10*
Clarion, Federal to Wharton.....	39	0	1
“ Wharton to Reed.....	33	2	2
“ Reed to Dickinson.....	44	0	0
“ Dickinson to Tasker.....	42	0	0
Reed, Broad to Thirteenth.....	16	0	0
“ (Thirteenth to Tenth, Public).....			
“ Tenth to Ninth.....	4	14	0
“ Eighth to Seventh.....	13	7	0
“ Seventh to Sixth.....	4	23	2
Alexander, above Wharton.....	31	1	1
Lentz, Thirteenth to Twelfth.....	31	0	0
“ Twelfth to Eleventh.....	26	2	0
Parade, Twelfth to Eleventh.....	28	2	0
Austin, Wharton to Reed.....	27	0	0
Dean, Federal to Wharton.....	18	0	0
“ Dickinson to Tasker.....	39	1	1
“ Tasker to Morris.....	23	2	1
“ Mifflin to McKean.....	48	0	0
Seybert, North of Wharton.....	7	10	0
Ashland, North of Wharton.....	29	0	0
Thirteenth, Federal to Wharton.....	13	31	0
“ Wharton to Reed.....	0	16	0
“ Reed to Dickinson.....	0	27	10*
“ Dickinson to Tasker.....	0	25	15*
“ Moore to Mifflin.....	10	13	13*
Twelfth, Federal to Wharton.....	11	4	1
“ (Wharton to Reed, Public).....			
“ Reed to Dickinson.....	17	0	0
“ Dickinson to Tasker.....	23	0	1
“ Tasker to Morris.....	23	2	1
“ Morris to Moore.....	17	4	1
“ Moore to Mifflin.....	14	27	4
“ Mifflin to McKean.....	31	0	6*
Eleventh, Wharton to Federal.....	19	13	1
“ (Wharton to Dickinson, Public).....			
“ Dickinson to Tasker.....	2	8	0
“ Tasker to Morris.....	36	4	1
“ Morris to Moore.....	13	6	0
“ Moore to Mifflin.....	6	0	2*
“ Mifflin to McKean.....	14	0	0
“ McKean to Snyder.....	8	0	2*
Tenth, Federal to Wharton.....	0	24	0
“ Wharton to Reed.....	6	34	2
“ Reed to Dickinson.....	4	10	0
“ Dickinson to Tasker.....	3	15	0
“ Tasker to Morris.....	2	13	0
“ Morris to Moore.....	19	19	0
“ Moore to Mifflin.....	18	4	0
“ Mifflin to McKean.....	40	27	0
“ McKean to Snyder.....	10	28	0
Ninth, Wharton to Reed.....	12	21	1
“ Reed to Dickinson.....	0	7	0
“ Dickinson to Tasker.....	1	15	0
“ Tasker to Morris.....	13	10	0
“ Morris to Moore.....	36	2	2
“ Moore to Mifflin.....	21	5	1

* Unfinished.

BUILDING SYSTEMS.

<i>Streets.</i>	<i>2-Story.</i>	<i>3-Story.</i>	<i>Vacant.</i>
Eighth, Tasker to Morris.....	3	8	0
" Morris to Moore.....	30	7	1
" Moore to Mifflin.....	22	7	1
Seventh, Dickinson to Tasker.....	10	17	0
" Tasker to Morris.....	35	3	0
" Morris to Moore.....	9	3	1
" (Moore to Mifflin not open.).....			
" Mifflin to McKean.....	16	17	1
Sixth, Moore to Mifflin.....	0	8	1
" Mifflin to McKean.....	15	17	0
Dickinson, Broad to Thirteenth.....	18	5	12*
" Thirteenth to Twelfth.....	10	0	0
" Twelfth to Eleventh.....	23	2	1
" Eleventh to Tenth.....	25	4	1
" Tenth to Ninth.....	8	3	0
" Ninth to Eighth.....	22	9	1
Tasker, Broad to Thirteenth.....	0	18	1
" Thirteenth to Twelfth.....	6	4	0
" Twelfth to Eleventh.....	14	0	0
" Eleventh to Tenth.....	15	23	4
" Tenth to Ninth.....	21	13	1
" Ninth to Eighth.....	26	9	0
" Eighth to Seventh.....	22	12	1
" Seventh to Sixth.....	19	9	0
Crumbach, Thirteenth to Twelfth.....	26	1	0
Moseley, Thirteenth to Twelfth.....	29	0	0
Aman, Twelfth to Eleventh.....	40	0	1
Guirey, Twelfth to Eleventh.....	30	0	0
Pallas, Dickinson to Tasker.....	21	0	3
" Tasker to Morris.....	34	0	6
" Moore to Mifflin.....	41	1	1
" Mifflin to McKean.....	47	0	3
Morris, Thirteenth to Twelfth.....	10	5	1
" Twelfth to Eleventh.....	25	2	2
" Eleventh to Tenth.....	34	2	1
" Tenth to Ninth.....	37	5	1
" Ninth to Eighth.....	8	10	0
" Eighth to Seventh.....	38	4	0
" Seventh to Sixth.....	36	2	0
Taylor, Eleventh to Tenth.....	3	1	0
" Tenth to Ninth.....	14	4	1
" Ninth to Eighth.....	16	1	1
Cross, Eleventh to Tenth.....	15	2	0
" Tenth to Ninth.....	34	4	0
" Ninth to Eighth.....	22	1	0
Fernon, Eleventh to Tenth.....	35	1	1
" Tenth to Ninth.....	26	1	1
" Ninth to Eighth.....	16	8	0
Fisher, Seventh to Sixth.....	48	4	0
Sylvester, Seventh to Sixth.....	38	2	1
Mountain, Eleventh to Tenth.....	28	1	0
" Tenth to Ninth.....	27	2	1
" Ninth to Eighth.....	15	8	1
" Eighth to Seventh.....	14	1	0
Watkins, Twelfth to Eleventh.....	39	1	0
" Eleventh to Tenth.....	26	1	0
" Tenth to Ninth.....	33	0	1
" Ninth to Eighth.....	25	0	1
" Eighth to Seventh.....	47	1	0
" Seventh to Sixth.....	38	2	1
Pierce, Twelfth to Eleventh.....	36	0	2
" Eleventh to Tenth (not open).....			
" Tenth to Ninth.....	38	1	1
" Ninth to Eighth.....	38	0	0
" Eighth to Seventh.....	39	1	0
" Seventh to Sixth.....	28	2	1
Moore, Thirteenth to Twelfth.....	10	5	1
" Twelfth to Eleventh.....	14	1	0
" Eleventh to Tenth (not open).....			
" Tenth to Ninth.....	38	0	1
" Ninth to Eighth.....	37	0	0
" Eighth to Seventh.....	31	0	4
" Seventh to Sixth.....	7	10	0
McClellan, Tenth to Ninth.....	24	0	0
" Ninth to Eighth.....	36	3	0
" Eighth to Seventh.....	38	2	0
Grant, Tenth to Ninth.....	21	1	0
Siegel, Eighth to Seventh.....	38	4	1
Mifflin, Broad to Thirteenth.....	11	0	4*
" Thirteenth to Twelfth.....	26	2	1
" Twelfth to Eleventh.....	19	1	1

* Unfinished.

Streets.	2-Story.	3-Story.	Vacant.
Mifflin, Eleventh to Tenth.....	14	0	0
" Tenth to Ninth (to Eighth not open).....	19	3	0
" Eighth to Seventh.....	34	2	2
" Seventh to Sixth.....	16	2	3
Hoffman, Tenth to Ninth.....	40	0	1
" Eighth to Seventh.....	10	2	1
" Seventh to Sixth.....	26	2	0
Blackburn, Moore to Mifflin.....	16	0	1
Bancroft, Mifflin to McKean.....	44	0	4*
Farrell, Mifflin to McKean.....	20	0	1
Gerhard, McKean to Snyder.....	32	0	10*
Passyunk, Ninth to Tenth.....	0	43	0
" Eleventh to Twelfth.....	10	30	0
" Moore to Mifflin.....	1	29	3
" Mifflin to McKean.....	13	5	0
Canal, above Thirteenth.....	27	1	10*
Conroy, above Thirteenth.....	29	1	20*
Totals.....	3,295	959	87

In all, 4,252, of which 87 are vacant and finished, or 2 per cent. only—132, vacant and unfinished.

STATISTICAL SUMMARY OF THE TENANT-HOUSES AND CELLARS, AND THE DISTRIBUTION AND STATISTICS OF THEIR POPULATION, ETC., IN THE CITY OF NEW YORK, AT THE CLOSE OF THE YEAR 1864.

(From the Sanitary Survey of New York, 1865.)

WARDS.	Total No. of Tenant-Houses.....	Total No. of Families in Tenant-Houses.....	Average No. of Families in each House.....	Total Population in Tenant-Houses.....	Average Population in each House.....	Total Cellar Population..	Total population in Cellars and Tenant-Houses.	Total No. of Tenant-Houses without Sewers.	Total Population in Unsewered Houses.....
First.....	250	2,181	8½	8,564	34¼+	498	9,062	89	2,606
Third.....	54	310	5¾	1,248	24½	57	1,305	28	640
Fourth.....	486	3,636	7½	17,611	35¼+	346	17,597	151	4,473
Fifth.....	462	2,597	5½	10,370	24¾+	836	11,206	293	5,796
Sixth.....	605	4,406	7¼	22,401	34½—	496	22,897	214	6,612
Seventh.....	627	4,586	7¼	19,293	30¾	1,233	20,526	409	10,953
Eighth.....	625	3,977	6½	15,630	25+	1,258	16,888	302	6,530
Ninth.....	596	3,836	6½	14,955	25½	217	15,172	208	4,485
Tenth.....	534	4,487	9	18,140	34—	453	18,583	110	2,953
Eleventh.....	2,049	13,433	6½	64,254	31½	1,366	65,620	403	10,026
Thirteenth.....	540	3,729	6¾	14,997	27¾	939	15,936	215	5,089
Fourteenth.....	546	4,509	8½	20,008	36¾	417	20,425	207	6,202
Fifteenth.....	197	1,358	7	4,970	25—	235	5,205	72	1,237
Sixteenth.....	1,257	7,088	5½	31,500	25+	2,150	33,650	300	7,107
Seventeenth.....	1,890	15,974	8½	63,766	34¾+	2,441	66,207	155	4,596
Eighteenth.....	836	7,267	8¾	35,869	42½	230	36,099	98	3,766
Nineteenth.....	571	3,632	6½	16,067	28¾+	205	16,272	81	1,912
Twentieth.....	1,162	8,344	7½	32,205	27¾	1,013	33,218	291	7,968
Twenty-First.....	1,026	7,299	7	36,675	35½—	135	36,870	144	4,491
Twenty-Second.....	996	7,714	7½	31,845	32—	699	32,544	162	3,233

This table presents the Statistics of Tenant-Houses, as reported by the Sanitary Inspectors of the Council of Hygiene, and verified in a recent inspection by the Metropolitan Police.

The total number of tenant-houses, none of which contain less than three families,

* Unfinished.

who hire their apartments by monthly or very brief periods of rental, is 15,511. This exceeds, by 202, the number which the Council of Hygiene, as well as the Metropolitan Police, has elsewhere given.

The total population of these tenant-houses at the time of last inspection was 486,000

The total population in cellars was 15,224

Total in tenant-houses and cellars..... 501,224

NOTE.—The Sanitary Inspectors of the Twelfth Ward report that there are 202 tenant-houses of the larger class (averaging more than six families in a house) in that Ward. In the same Ward there are 643 inhabited *shanties*, and 710 other tenements of a poor class, but not having three families each, consequently not counted in the statistics of tenant-houses.



